UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/710,538 | 07/20/2004 | Nahum Gat | OKSI-007-Reg. | 4537 |

7590 12/13/2007

Opto-Knowledge Systems, Inc.
19805 Hamilton Avenue
Torrance, CA 90502-1341

| EXAMINER | |
|---|---|
| SAUNDERS, PAUL | |
| **ART UNIT** | **PAPER NUMBER** |
| 2622 | |
| **MAIL DATE** | **DELIVERY MODE** |
| 12/13/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/710,538 | GAT, NAHUM | |
| | Examiner | Art Unit | |
| | Paul Saunders | 2622 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *20 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/20/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Oath/Declaration*

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because: It was not executed in accordance with 37 CFR 1.66 or 1.68 and further 1.4(d)(2). See MPEP § 502.02. It is suggested to use a handwritten signature or S-signature.

### *Claim Objections*

2. **Claim 19** objected to because of the following informalities. Appropriate correction is required.

Regarding **claim 19**, antecedent basis for "*said* long exposure time" is not found. It is suggested that claim 19 depend from claim 18. Antecedent basis for "*the* complete interferogram" is not found. It is suggested to change the italicized to "a". Further, support in the specification disclosure for the phrase "said long exposure time is sufficient to capture the complete interferogram" is not found.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claim 18** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "relatively long" is used in regards to the length of time to provide a stable image for the imaging system. An intended standard of measurement is not found in the claims or the specification disclosure to determine how long "a relatively long exposure time" is. Therefore, claim 18 is indefinite. See MPEP § 2173.05(b)(F).

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. **Claims 1-8,10-11,17-22** rejected under 35 U.S.C. 102(e) as being anticipated by

a. *Partynski* (US 6,826,358 B2).

Regarding **claim 1**, *Partynski* discloses a compact line of sight stabilization system for use with an imaging system located about an unstable carrier platform (fig. 1, col. 7 lines 63-67), said stabilization system comprising at least two mirrors 82, 84, each of said mirrors being mounted to a fixed platform by aiming means 74, 114; said aiming means allowing independent

rotation of said mirrors about at least one of the axes in the plane of said mirrors (fig. 6, 11, col. 10 lines 23-32, col. 12 lines 45-54 – plane of mirrors being perpendicular to the roll axis wherein mirrors rotate at different speeds in the pitch axis);

at least one of said mirrors being mounted by aiming means allowing rotation about at least two of said axes (fig. 3, 5, col. 9 lines 63-67, col. 10 lines 23-29 – at least one mirror can rotate in the roll axis 37 and the pitch axis 75);

a hardware control means 34 for directing said aiming means (fig. 17, col. 21 line 60-col. 22 line 67);

said stabilization system being mounted in the line of sight of said imaging system (fig. 4A);

said stabilization system providing at least one of pitch, roll, yaw, and forward motion compensation corrections while maintaining consistent image orientation, for said imaging system (col. 5 lines 1-5, 46-67, col. 6 lines 14-34, col. 9 lines 17-35, col. 10 lines 26-29).

Regarding **claim 2**, *Partynski* further discloses a stabilization system as in claim 1 wherein said imaging system comprises at least one of a pushbroom, whiskbroom, fourier transform, and electronically tunable filter type sensor systems (fig. 2, col. 8 lines 19-37, col. 10 line 60-col. 11 line 12).

Regarding **claim 3**, *Partynski* further discloses a stabilization system as in claim 1 wherein said imaging system comprises one of a multispectral, hyperspectral, or ultraspectral sensor system (Abstract, fig. 4A, col. 9 lines 36-63, col. 25 line 66-col. 26 line 29, claim 10).

Regarding **claim 4**, *Partynski* further discloses a stabilization system as in claim 1 wherein said carrier platform is selected from an airplane, a helicopter, a satellite, an automobile, or a boat (fig. 1, col. 7 lines 63-67).

Regarding **claim 5**, *Partynski* further discloses a stabilization system as in claim 1 wherein said aiming means is selected from at least one of mechanical, piezoelectric, and electromagnetic means (col. 9 lines 63-67, col. 10 lines 21-23).

Regarding **claim 6**, *Partynski* further discloses a stabilization system as in claim 1 wherein said hardware control means receives movement data from at least one of pitch rate, roll rate, yaw rate, and forward motion rate sensors (col. 22 lines 60-67, col. 23 lines 35-38).

Regarding **claim 7**, *Partynski* further discloses a stabilization system as in claim 6 wherein said sensors exist independently of said stabilization system (col. 23 lines 35-38).

Regarding **claim 8**, *Partynski* further discloses a stabilization system as in claim 6 wherein said sensors comprise at least one of an inertial measurement system and an attitude and heading reference system (col. 23 lines 35-38).

Regarding **claim 10**, *Partynski* further discloses a stabilization system as in claim 6 wherein said hardware control means comprises a computer system 401 receiving said movement data from said at least one sensor (col. 22 lines 60-67, col. 23 lines 35-38), said computer system additionally comprising algorithm means for determining the current angle of said carrier platform from said sensor data and the integration over time of said movement rates (fig. 1, 2, col. 8 lines 11-50, col. 25 lines 33-58 – current angle which depends on roll compensation in which rate of rotation is calculated from sensor data and integration over time is seen between each $\delta$).

Regarding **claim 11**, *Partynski* further discloses a stabilization system as in claim 10 wherein said mirrors are aimed responsively to said current angle of said carrier platform (fig. 1, 2, col. 8 lines 11-50, col. 25 lines 33-58).

Regarding **claim 17**, *Partynski* further discloses a stabilization system as in claim 1 wherein said aiming means causes at least one of said mirrors to rotate such that said mirrors adjust said line of sight of said imaging system

providing compensation for at least one of pitch, roll, yaw, and forward motion (col. 5 lines 1-5, 46-67, col. 6 lines 14-34, col. 9 lines 17-35, col. 10 lines 26-29).

Regarding **claim 18**, *Partynski* further discloses a stabilization system as in claim 1 wherein said imaging system requires a stable and non-changing image for a relatively long exposure time and wherein said stabilization system provides said forward motion compensation to provide said imaging system with said non-changing image (col. 5 lines 61-67, col. 16 lines 54-58, 62-64).

Regarding **claim 19**, *Partynski* further discloses a stabilization system as in claim 1 wherein said imaging system is an ultraspectral imaging system and wherein said long exposure time is sufficient to capture the complete interferogram (col. 4 lines 35-65 – LWIR/MWIR Ultraspectral imaging system).

Regarding **claim 20**, *Partynski* discloses hardware control means 34 (fig. 17) for a compact line of sight stabilization system, said stabilization system comprising at least two mirrors 82, 84 in the line of sight of an imaging system for use on a carrier platform capable of being unstable (fig. 1, col. 7 lines 63-67), said mirrors capable of being aimed (fig. 2, 6, col. 10 lines 23-32), said hardware control means receiving movement data from at least one of pitch rate, roll rate, yaw rate, and forward motion rate sensors (col. 22 lines 60-67, col. 23 lines 35-38), said hardware control means aiming said mirrors as required providing at

least one of pitch, roll, yaw, and forward motion compensation (col. 5 lines 1-5, 46-67, col. 6 lines 14-34, col. 9 lines 17-35, col. 10 lines 26-29).

Regarding **claim 21**, *Partynski* further discloses hardware control means as in claim 20 comprising a computer system receiving said movement data, said computer system additionally comprising algorithm means for calculating the current angle of said carrier platform from said movement data and the integrating over time of said movement rates.

Refer to the rejection of claim 10.

Regarding **claim 22**, *Partynski* further discloses hardware control means as in claim 21 wherein said mirrors are aimed responsively to said calculated current angle of said carrier platform.

Refer to the rejection of claim 11.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claim 9** rejected under 35 U.S.C. 103(a) as being unpatentable over

b. *Partynski* (US 6,826,358 B2)

in view of

c. *Padera* (US 4,828,376 A).

Regarding **claim 9**, *Partynski* does not expressly disclose the following: a stabilization system as in claim 8 wherein at least one of said sensors comprises three orthogonal gyrometers.

*Padera* discloses three orthogonal gyrometers being pitch 50, yaw 52, and roll 54 sensors for use in a stabilization system (fig. 12, col. 1 line 67-col. 2 line 5, col. 4 lines 51-65). Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use three orthogonal gyrometers taught in Padera, as sensors in Partynski's system in order to assist in providing a stabilized platform (col. 1 lines 24-35).

9. **Claims 12-16,23-27** rejected under 35 U.S.C. 103(a) as being unpatentable over

d. *Partynski* (US 6,826,358 B2)

in view of

e. *Vaeth* (US 4,034,208 A)

Regarding **claim 12**, *Partynski* does not expressly disclose the following: a stabilization system as in claim 11 wherein said computer system comprises additional algorithms to predict subsequent angles for said carrier platform from said movement data and said current angle.

*Vaeth* discloses a target tracking system that produces an acceleration aiding signal for the pitch axis using movement data and current angle (Abstract, figs. 2-4, col. 4 lines 13-47, 65-col. 5 line 46). Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to further adjust the mirrors taught in Partynski according to an acceleration aiding signal taught in Vaeth in order to better track a target in varying situations (col. 1 lines 36-40).

Regarding **claim 13**, *Vaeth* further discloses a stabilization system as in claim 12 wherein said predictive algorithm additionally accounts for at least one of system noise, drift, and temperature-induced errors (col. 1 lines 35-66).

Regarding **claim 14**, *Vaeth* further discloses a stabilization system as in claim 12 wherein said hardware control means aims said mirrors to compensate for said predicted new angle, before said carrier platform reaches said new angle (col. 3 line 44-col. 4 line 4, col. 5 lines 1-47 – an acceleration aiding control responsive to error signal).

Regarding **claim 15**, *Vaeth* further discloses a stabilization system as in claim 12 further comprising a feedback algorithm wherein said feedback algorithm determines whether said line of sight matches the line of sight obtained

from said predictive angle algorithm (Abstract, col. 2 lines 13-15, col. 4 lines 37-47, 50-64) .

Regarding **claim 16**, *Vaeth* further discloses a stabilization system as in claim 15 wherein said hardware control means applies an optimization algorithm to compensate for mismatches found by said feedback algorithm (col 2. lines 18-31 – dynamic tracking provided within tolerance).

Regarding **claim 23**, *Vaeth* further discloses hardware control means as in claim 22, said computer system storing said carrier platform current angles over time, wherein said algorithm means applies said movement data to said stored angle data to predict subsequent new angles of said carrier platform.

Refer to the rejection of claim 12.

Regarding **claim 24**, *Vaeth* further discloses hardware control means as in claim 23 wherein said predictive algorithm additionally accounts for at least one of system noise, drift, and temperature-induced errors.

Refer to the rejection of claim 13.

Regarding **claim 25**, *Vaeth* further discloses hardware control means as in claim 23 wherein said hardware control means aims said mirrors to compensate

for said predicted new angle, before said carrier platform reaches said new angle.

Refer to the rejection of claim 14.

Regarding **claim 26**, *Vaeth* further discloses hardware control means as in claim 23 further comprising a feedback algorithm wherein said feedback algorithm determines whether said line of sight matches the line of sight obtained from said predictive angle algorithm.

Refer to the rejection of claim 15.

Regarding **claim 27**, *Vaeth* further discloses hardware control means as in claim 26 wherein said hardware control means applies an optimization algorithm to compensate for mismatches found by said feed-back algorithm.

Refer to the rejection of claim 16.

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pollock (US 4,825,055 A) teaches a target tracking gimbaled sensor.

Feinstein (US 3,591,250) teaches stabilization with two controlled mirrors each having axis of rotation orthogonal to each other and each with a gyro sensor.

Clune (US 5,805,325 A) teaches stabilization for electronic sensor with two mirrors with various embodiments of mirror axis rotations.

Slater (US 6,008,492 A) teaches an airborne hyperspectral imaging method.

Duchon (US 6,529,267 B1) teaches a pitch, roll, yaw pushbroom imaging method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Saunders whose telephone number is 571.270.3319. The examiner can normally be reached on Mon-Thur 9am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NgocYen Vu can be reached on 571.272.7320. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NGOC-YEN VU
SUPERVISORY PATENT EXAMINER